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ABSTRACT

The purpose of this booklet is to help teachers become familiar with current research-based spelling trends so that they can apply them in their classrooms. The first section of the booklet reviews current trends likely to influence spelling instruction, including practices related to the writing process, studying spelling from the learner's perspective, and computer assisted instruction. The second section discusses research findings related to both the content and the methods of spelling instruction. Topics discussed in this section include word selection, spelling rules, phonics, the test-study-test method, the list versus context approach, ineffective methods, and ways to measure spelling achievement. The third section offers suggestions for applying research findings to instruction in the areas of readiness, formal instruction, functional spelling, individualized spelling, and promoting student interests. (FL)

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Spelling Trends, Content, and Methods

by Ruel A. Allred

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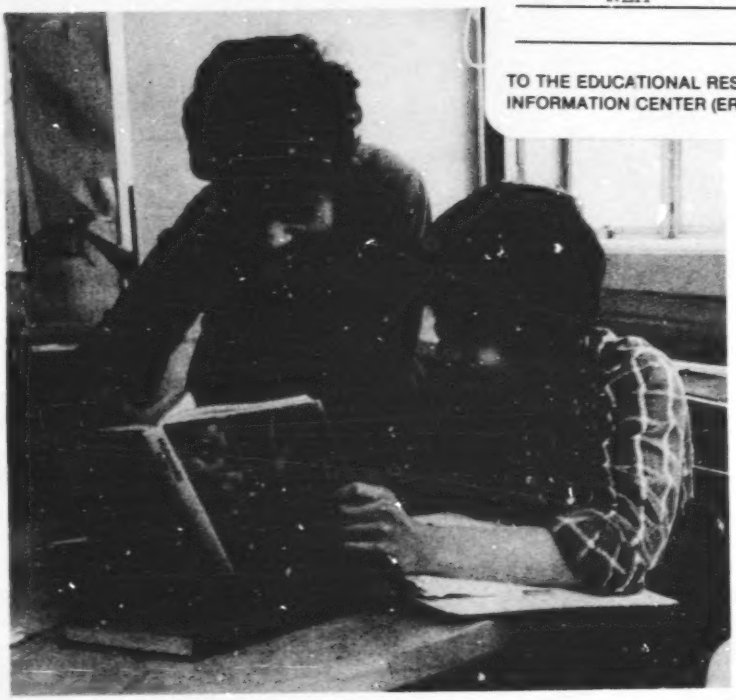

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Spelling Trends, Content, and Methods

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INTRODUCTION

The title of this monograph, *Spelling Trends, Content, and Methods*—a part of NEA's What Research Says to the Teacher series—contributes much to its writing. It provides both direction and limitations. It also provides the author with a sense of responsibility to its readers. It suggests that readers should expect to find helpful methods to apply in the teaching and learning of spelling, and that the methods should be based on consistent and valid research findings. It also suggests the need to identify areas that require further investigation.

Teachers will be able to apply some of the research findings independent of existing spelling materials; they will be able to use others with published programs. Some findings will appear somewhat new or unique; others will verify time-tested methods supported by research of the past.

First of all, it is important to place spelling in its proper perspective in the curriculum—as a tool to assist writers to express themselves accurately and effectively. Spelling is an important subskill upon which the effective writer depends. Although it is a minor area of the curriculum, because of its importance, neither parents, teachers, nor the public in general is willing to ignore it or see it neglected. Most people are familiar with the negative consequences of poor spelling. How many poor spellers have failed to express their desired thoughts in writing because uncertainty about exact spellings led them to use less effective words as substitutes? How many students have suffered from poor grades because of papers containing inaccurate spellings? How many people have been judged to be poorly educated because of inaccurate spelling in letters or other written communications? And how many people have not been hired, or even interviewed, for jobs they really wanted because of poor spelling on their employment applications?

For years spelling was one of the most carefully and widely researched areas of the curriculum. Much was learned and, to the degree that findings were implemented in the classroom, both students and teachers benefited. In recent years some educators have chosen to look seriously at spelling as it applies to the writing process. Others are studying it from the viewpoint of the learner— how one learns—and from the nature of English orthography. Even though it would be unfair to suggest that past writers and researchers had failed to take these factors into consideration, it is appropriate to recognize that the current emphasis has widened horizons and caused many to focus on learning spelling in new ways. It has also laid a foundation for extensive future research. This is especially the case in light of the stress on writing today. Schools in many parts of the country are implementing writing projects that are based on sound teaching techniques. What might have been considered a temporary

emphasis on the writing process a few years ago has grown into meaningful projects touching all levels of education. Classroom teachers, schools, school districts, and states are sponsoring these projects, which are a direct result of a national movement. Consequently, children and adults throughout the country should soon be able to enjoy the benefits of improved writing skills. As the computer and other technology become more effective and accessible, this potential will increase.

To help teachers become familiar with current spelling trends and past findings so that they can apply them in their classrooms, these topics will be discussed under the following headings: (1) current trends, (2) content and methods, and (3) suggested applications of research.

CURRENT TRENDS

As one visits classrooms, becomes familar with the literature, studies published materials, and attends conferences, workshops, and seminars, one finds it possible to identify prominent forces in the teaching of spelling. Foreseeable trends likely to influence spelling instruction during the next decade include practices related to the writing process, encouragement to study spelling from the learner's perspective, and the use of the computer.

Spelling and Writing

Throughout the United States and other parts of the world, writing is receiving increased emphasis. Because spelling is essential to the writing process, it too is in the spotlight. To obtain a proper perspective of spelling, it is helpful to look closely at writing and its place in today's curriculum.

One contributing factor to the enhanced role of writing in the curriculum is the way in which it is being viewed. Not only is it recognized for its utilitarian value, but also for its intrinsic value. Another contributing factor is the attention being given the writing process. In this exploration, it is important to recognize that effective writing instruction is not new, nor are all methods of the past obsolete. Useful guidelines have been established for years and may be found in much of the earlier literature. Burrows and others (15),* Applegate (6), Allen (2), and Tiedt (81) are but a few who have contributed to current philosophy and practices. These researchers have had impact on earlier educators as well as on those who are on the cutting edge today.

*Numbers in parentheses appearing in the text refer to the Bibliography beginning on page 29.

Despite previous efforts, however, writing has been identifed as one of the neglected and problem areas of the curriculum. According to Graves (37), during the 25-year period from about 1950 to 1975, when considerable monies were being spent on reading,

> For every $3,000.00 spent on children's ability to receive information, $1.00 was spent on their power to send it in writing. The funds for writing research came to less than .10 percent of all research funds for education. (p. 93)

This situation appears to be changing. During the late 1960's and 1970's productive workshops, seminars, and conferences held in both the United States and England highlighted the importance of writing and identified instructional methods. Educators who helped to change perceptions about the purposes of writing as well as the performance of writers include Moffett (64), Emig (27), Graves (38), and Gray (65) with their associates. Their influences, combined with an observed need at the University of California at Berkeley, helped bring about the National Writing Project, which is having profound impact in many parts of the country (35).

In 1973 Gray and his associates at the University of California at Berkeley began the Bay Area Writing Project to help improve the teaching of writing at the university's feeder schools. This project was the beginning of a teacher in-service program that was the forerunner of the current National Writing Project. In contrasting this movement with innovations of the past, Graves (67) observes:

> I keep thinking this movement will go bust—American curriculum movements being what they are. But it's not. Teachers are getting so much personal satisfaction that they don't want to give it up. And in writing, kids find themselves. That is something teachers have not seen for a long time. They are not going to let go of it. (p.6)

What is there in present approaches to teaching writing that helps children "find themselves" and brings about so much personal satisfaction to teachers? Contributing factors include the application of knowledge about the writing process itself and the identification and use of definable steps in that process. The steps may differ from project to project, but there is general agreement that they should include the following: (1) prewriting, (2) writing, (3) responding, (4) revising, (5) editing for an audience, (6) publishing, (7) evaluating, and (8) postwriting (75). Although much could be said about each step, comments here are restricted to the role of spelling in the process.

Spelling appears in most of the identified steps in some form. In first drafts, it may range from the "inventive spelling" (70) used by some children to the accurate and complete spelling of others. In a general way, spelling also plays a role in the revision stage when writers rearrange

their thoughts and ideas. According to current thinking, however, the correction of spelling in written work is reserved for the editing stage where along with other conventions of writing such as grammar, usage, capitalization, and punctuation, spelling receives special attention. "An effective writing program acknowledges the importance of editing, helps students learn to appreciate the value of editing, and provides practice for writers to learn to edit their work" (75, p. 17). Here, misspelled words are carefully checked and corrected in preparation for "publication."

The editing process may include self-editing with the aid of a checklist, editing by students in small groups or pairs, or the involvement of teachers or other adults. Whatever the activity, accurately spelled words in a final product are a desired outcome.

An earlier recommendation may prove useful at the editing stage. Referring to student compositions, Horn (53) stated, "The evidence indicates that the mere checking of spelling errors does little good unless accompanied by an effective plan for learning the words which have been misspelled" (p. 13). In addition to a plan for correcting composition spelling errors, there should be procedures for learning mispelled words. These procedures have not yet been sufficiently identified or studied, but a shift in the nature of investigating writing and spelling from the empirical to the case study approach (26, 37) is providing some new insights. Indications are that this form of investigation may provide valuable information as it is used more widely and as researchers become more skilled in its application.

Spelling is important in the writing process. In the initial stages of writing, whether they use "inventive" or more accurate spelling, students can communicate ideas and feeling to others, thus improving their thinking and communication. In the editing stage, students can learn words related to their compositions by identifying and correcting misspelled words. However, continued research is needed to identify the most productive means of improving spelling ability during the writing process. The case study approach shows promise of providing some of this information.

Approaching Spelling from the Ways Learners Learn

During the past two decades some educators have chosen to study spelling from the ways learners learn and from the nature of English orthography (71). Hodges, discussing these perspectives in the 1981 NCTE publication *Learning to Spell: Theory and Research into Practice* (49), takes the position that "ability to spell is a highly complex and active intellectual accomplishment" (p. 9).

This position finds some of its roots in the work of Hanna and others (41) whose 1966 study at Stanford University used computer technology to analyze 17,000 words to determine symbol-sound relationships as well as the spelling of individual speech sounds in syllables. The computer spelled over 8,000 of the words, or about 50 percent, correctly. Many other words had but one misspelling, causing the researchers to conclude that English spelling contains numerous consistent symbol-sound relationships. Reactions to the study were varied, however. To some observers, the fact that only 50 percent of the words were spelled correctly demonstrated the irrational nature of English spelling (46; 20, p. 267). To others, the study verified the underlying systematic nature of English orthography (23; 20, p. 272). Still others suggested verifying these findings through additional research before accepting them wholesale (4, p. 44).

Hanna's study had an impact on the literature and on classroom programs as educators conscientiously attempted to teach English spelling from a rather rigid phoneme-grapheme, generalization point of view. Subsequent study and research caused Hodges (49) to conclude that—

> A significant factor of English orthography . . . eluded the Stanford researchers; namely, that the appropriate unit of analysis in looking at English spelling is not phoneme-grapheme correspondences by themselves but how these correspondences are governed by the words in which they occur (Vanezky 1976). Thus, while the researchers had demonstrated how adjacent sounds and letters influence each other . . . their study did not take into account that related words have related spelling despite sound changes . . . nor did it take into account word-building factors such as adding prefixes and suffixes. (pp. 6–7)

Hodges also observed that the language is both systematic and developmental, and "there is a high degree of similarity between the process of acquiring spoken language and that used to master written language" (49, p. 8). Among the studies he cited to support conclusions about the acquisition and development of language with implications for spelling were those conducted by Read (70), and by Henderson and his associates at the University of Virginia (45). Read found that children at an early age are able to detect the phonetic characteristics of English words, and although they misspelled several words, by applying their intuitive knowledge of the English sound structure, they misspelled many of them in the same ways. He further showed that children's judgments about relationships between speech and writing are qualitatively different from those of adults, thus demonstrating the developmental nature of language. According to Hodges (49), Read showed that "spelling errors provide valuable information about the mental process of young learners" (p. 9).

By analyzing the kinds of errors made by school-age children in free writing experiences, researchers at the University of Virginia (8) conclud-

ed that students progressed through developmental stages in the spelling process. Hodges (49) summarized their findings as follows:

> Young spellers went through three invariant stages as they developed strategies for spelling. In the first, they used a letter-name strategy in much the same way that Read's preschoolers had. In the second, they showed some refinement in how they spelled vowel sounds, using letters to represent sounds other than the sounds that resembled letter names. In the third stage, they began to use information about features of the English writing system itself . . . These young spellers, it was seen, did not lack phonetic knowledge in relation to alphabet letters, but they did lack knowledge about word structure, a knowledge that is gained only through experiences with written language over time. (p. 10)

Thus Hodges contended that these studies support the position that learning to spell is a developmental process that results in a greater understanding of English spelling than simple relationships between speech sounds and their written symbols. Concluding that spelling instruction should not be confined to the formal study provided by commercial and school district programs, he made five additional recommendations (49, pp. 11-13). In short, they are as follows:

1. Spelling should be taught in the context of general language study. It should provide children with opportunities to explore the ways in which their knowledge of spoken language relates to writing and how to apply that knowledge to spelling.
2. The focus of spelling should be on presenting spelling as an integrated system. Activities that foster word exploration can contribute significantly to this understanding.
3. A variety of instructional materials and approaches should be used to provide for individual learning styles and rates.
4. Spelling instruction should foster an exploration of English spelling, building on the natural inquisitiveness of children and providing opportunities for them to apply growing orthographic knowledge in a variety of writing situations.
5. Spelling instruction needs to provide numerous opportunities for students to assess their written words and, with teacher guidance, to use spelling errors as a springboard to new understandings about the orthography.

These suggestions are based upon research and sound logic. The procedures themselves now need to be studied through carefully controlled research in the classroom.

The position that spelling should be viewed from the ways learners learn and from the nature of English orthography has widened horizons,

has caused educators to view the learning of spelling in new ways, and has laid a foundation for extensive research. It is already having some impact in the schools, but it needs to be carefully researched both independent of and in conjunction with proven methods.

Computer Applications of Spelling

The microcomputer is exerting influence on many aspects of learning both at school and in the home. Its capacity to store and display information, to motivate and reward learners, to diagnose and prescribe, to provide drill and practice, to allow student control, and to individualize instruction make it well suited for the study of spelling. In addition, its capacity for independent use or for use with other instructional materials provides flexibility.

As the computer is used for spelling instruction it can be expected to enhance learning and save time by permitting students to study material that is appropriate for them. It will also assist them to stay on task. And, as authors, programmers, and learners become more sophisticated in their preparation and use of materials, it will add to knowledge about learning. In this way it can be used to apply and support some of the valid research findings of the past as well as to alter other findings.

Since the microcomputer is relatively new, it should be helpful to identify available research findings as well as to indicate some promising areas of possible future spelling research. The information could be a future reference point and stimulate efforts in areas needing attention.

Research to Date

Researchers at Stanford University were among the first to envision the potential of the computer. They pioneered its use in spelling along with other areas of the curriculum. Worthy of special note are studies of Knutson (58) and Fishman and others (29). Knutson reported that immediate repetition and spaced repetition produced substantial learning by students using computers, additional practice on words was more effective than no repetition, and spaced repetition was consistently favored over the other two methods. Reporting on the use of computerized spelling drills to study conditions of massed and distributed practice with fifth-grade students, Fishman and others found that massed repetitions appeared to be better on short-term performance, but more learning occurred in the long run when repetitions were well distributed.

Hansen (43) reported that low-ability students performed better when they studied a list of 18 difficult words broken down into three groups than when they studied the entire list at once. And Block and others discussing another early effort reported "preliminary notions regarding

the interface between drill-and-practice and tutorial CAI (Computer-Assisted Instruction) in spelling" (12).

The computer has also been used to study spelling patterns. Interest growing out of Hanna's original work (41) motivated other investigators to use it for similar purposes. Dunwell and others (23) used the computer to stress spelling patterns rather than individual words and found the experimental group made significantly greater gains than did the control group with no appreciable differences associated with socioeconomic status. These researchers concluded that computer-assisted instruction was an efficient means of teaching spelling.

In 1974 Block, Tucker, and Butler (13) reported a study demonstrating the computer's capacity to confirm or refute past research and also shed new light on controversial issues. One issue centered around the best method of presenting spelling words to learners for maximum growth—whole word or in parts. Recognizing computerized drill as "an excellent mode for studying the effects of instructional variables because learning conditions can be well controlled" (p. 2), these researchers chose to study this "methods" variable in the context of such a drill. They compared two methods of dividing words (by chunk or letter) to the whole (undivided) word method to determine their relative effects on the rate of learning and retention in spelling. Results showed learning rates were influenced by the way the correct spelling was displayed. Words displayed by chunks were learned more rapidly than were whole words; words displayed by letters were learned more rapidly than either of the other two methods. However, retention level was unaffected by these approaches. The study confirmed past research related to the value of distributed over massed practice and of spaced practice.

In a study that compelled third graders who were poor spellers to observe the detail of both letter and numeral sequence, Robertson (77) found this forced sequenced activity helped children make substantial growth over a short period of time. She also found that "children who were frustrated with failure in the classroom responded positively with enjoyment to the challenge of the computer-assisted programs presented on the teletype terminals" (p. 1). Children involved in the study did not seem to have a sense of failure when they made an incorrect response on the teletype terminal, rather, they reacted as if they were playing a challenging game with the opportunity to try again.

The title of the article by Hasselbring and Owens (44), "Microcomputer-Based Analysis of Spelling Errors," indicates another area that is ripe for program development and research. These researchers stressed the limitations of widely used tests that "do not yield an analysis of spelling error patterns," but simply provide a grade equivalent or standard score. Calling attention to the expertise and inordinate amount of teacher time required to give and score diagnostic tests, they suggested the microcom-

puter as a logical alternative. Among its advantages, they found that "spelling responses can be entered directly by students and rapidly analyzed for error patterns. Error analyses can be displayed and records of performance stored for future use" (p. 26). They reported that research using the Computerized Test of Spelling Errors (CTSE) "has demonstrated that students' responses on the microcomputer yield results similar to those obtained using a traditional paper and pencil format," and they also pointed out that "research suggests that microcomputers can be used for diagnosing learning problems in both regular and special educational settings without the fear of biasing the results" (pp. 28, 30). Other advantages cited included student self-pacing during evaluation and teacher time saved during scoring.

A major problem facing the teacher of spelling is individual differences in the classroom (36, p. 7). These differences appear in the ranges of ability among students as well as in the ways that individuals learn, and have frustrated teachers throughout the years. One of the promises of the computer is at least a partial solution to this problem. To illustrate, Demshock and Riedesel (21) found no significant differences between the methods investigated in their study, but they were quick to conclude that the computer could individualize spelling instruction.

The computer has been found useful in remediating spelling problems for learning handicapped students. It has also been used for the comprehensive purposes of testing, management, tutorial instruction, drill and practice, exploration and discovery, problem solving, and other instructional assistances demanded by an individualized school (11). Hansen's 1966 statement about the computer and education is appropriate in the area of spelling today:

> CAI represents one of the many new innovations on the educational horizon. It shares with other innovations a major developmental barrier. After the conceptual and technological potentialities have been established by its creators, be their contributions pedagogical, scientific, or engineering in nature, the educational channels of communication are filled with rosy prophesies of the future if only the total educational structure will participate in the advantages of this proposal. These published and spoken messages stress the panacea-like characteristics of the innovation but fail in many instances to mention the required research and development stages remaining before the prophesies can be fulfilled. I would contend that educators readily accept the conceptions and possibilities of each new innovation, but fail to appreciate the substantial commitments for intricate and unaccustomed new operational orientations, patterns, and routines. Far too few are aware of the extensive research and development activities required before the benefits of an innovation become available . . . (p. 14)

Future Research Areas

Major areas that show promise for computer-related research in spelling are those relating to motivation, individualized instruction, diagnosis and prescription, visual memory, editing, testing theories of learning as applied to spelling, and computer use with exceptional children—both handicapped and advanced. Although token efforts have been made in some of these areas, more careful and thorough investigations are needed.

Specific topics for investigation could include drill and practice, recordkeeping, progress monitoring, tutorial models, proofreading, and the value of audio. Undoubtedly, findings concerning existing and yet-to-be-discovered approaches to teaching spelling will provide direction for teachers, parents, and students. Future investigations might also reevaluate past research findings—for example, the study of hard parts of words, the study of words by syllable, and the value of certain rewards.

One of the benefits that might be expected from "revisiting" past research via the computer will be the ability of the computer not only to more carefully control the research conducted, but also to enhance what has been done. For example, an accepted spelling research finding is the value of the self-corrected test. In that process the student has thought about the spelling, has selected and written his/her choice, and has then had the advantages of immediate feedback. At this point the word is either "passed" or identified as one to study. The computer could enhance this method of learning by providing meaningful feedback as well as self-correction and then directing the student into one of a number of learning activities based on individual performance and learning style.

Like the wheel, the printing press, and the steam engine, the computer will jolt civilization into another way of life. It will certainly contribute to breakthroughs in education. Spelling is an area in which it can have impact. As might be expected, research in computer use in spelling is limited in volume and scope. Most reported findings still need verification through more extensive research over longer periods of time. Perhaps the major benefit to be derived at this time is not the limited findings available, but rather a vision of what might be.

CONTENT AND METHODS

The consequences of new ideas in education sometimes include the abandonment of existing practices. Then, after a time of trial and experimentation, elements of the "old" return to combine with the "new" to form the curriculum. One result of such a pattern is the loss of practices that could have had continuing positive influences—a result that should be avoided.

A debate has arisen in the area of spelling with Hillerich (48) encouraging the application of past research findings stressing one point of view and Hodges (50) just as enthusiastically stating the "new" position. Although such debates are stimulating, it would be unfortunate if one position or the other were to "win," for both sides have much to offer. The attempt here is to recognize the best of the past as well as of current thinking and to encourage their "early marriage."

The previous section of this monograph described the role of spelling in the writing process, spelling viewed from the ways learners learn, and computer applications of spelling. It is now appropriate to review other research findings and to encourage their continued use as part of the movement that will be experienced during the next decade.

Among the problems facing teachers of spelling is knowing what to teach and how to teach it. Several reviews of research findings (52, 78, 4, 31, 18) provide useful guidelines. The following pages contain summaries of relevant information for this purpose.

Content

When the dust of debate has cleared and the task of teaching is on the line, accurate spelling, in whatever context, still amounts to placing letters in words in acceptable, conventional form. As a result, part of the content in any spelling program must be the learning of a sufficient number of words to make functional writing possible. Once students are ready to learn, teachers can help them accomplish this task by (1) teaching the most useful words, (2) making proper application of rules, (3) applying phonics appropriately, and (4) continuing to develop the kind of visual memory that enhances spelling ability. The following research guidelines can assist teachers in these efforts.

Selection of Words

Core Vocabulary. There are over 600,000 words in the English language. It is unrealistic to expect teachers to teach students how to spell even ten percent of them. It is beneficial and realistic, however, for children to learn the segment of the vocabulary that will benefit them most. Research findings provide clear direction.

Spelling programs should include those words used frequently in writing. Rinsland's 1945 study (76) of 6,000,000 running words revealed that 1,000 of these represented 89% of all words elementary school children used in their writing. Two thousand represented 95% and 3,000 represented 97% of the words they wrote. Horn's adult study (51) showed usage percentage almost identical. Considering the 2,000-word overlap between the first 3,000 words of the two studies, 4,000 words accounted for 97% of all those that children and adults used in their writing (4, p.

17). Even though some words will disappear from the list and new ones take their place as studies are updated or duplicated (17, 47), it is still safe to state that the percentage will vary little. This means that approximately 4,000 words will continue to represent 97% of the words children and adults will use in their writing. Each child deserves this "security" or "core" vocabulary for present and future use. It is not unrealistic to expect schools to provide it.

Demons. At one point in the history of spelling instruction, the topic of spelling "demons" and their identification and mastery achieved considerable importance. In 1951 Fitzgerald (30) identified 222 spelling words that accounted for 52 percent of all words children misspelled in their writing. For a time when the utility of learning these words was acknowledged, they seemed to dominate the spelling scene. During the past few decades this focus has been minimized, possibly because of its limited nature and the fact that many misspelled words continued to appear in children's writing even after they mastered the "demons."

A few frequently misspelled words will continue to account for the majority of misspellings. Learning these words as part of a greater spelling program is an efficient and worthwhile use of time. Once again, updated studies may change a few words on the list, but it is safe to conclude that less than 300 words still account for more than half the words children misspell in their writing. Therefore the teaching and learning of these words merit special consideration.

Rules

It would be advantageous if words could be organized under a predetermined set of spelling rules and learning those rules could enable students to spell needed words. Unfortunately the English language was not created from a set of rules. It evolved in many ways with words and elements representing a number of languages (78 pp. 1–2). Researchers who have investigated the language to find order have discovered sufficient irregularities and exceptions to make the learning of rules only marginally helpful (31, pp. 18–23) and only a limited number of rules to be of value in spelling (10, 36). Those rules that are based on research findings and of value to the speller are as follows (72, pp. 46–48):

1. Some rules governing the addition of suffixes and inflected endings are:

   a. Words ending in silent **e** drop the **e** when adding a suffix or ending beginning with a vowel and keep the **e** when adding a suffix or ending beginning with a consonant.

bake	manage
baking	managing
baker	management

b. When a root word ends in **y** preceded by a consonant, the **y** is changed to **i** in adding suffixes and endings unless the ending or suffix begins with **i**.

fly	study
flies	studying
flying	studious
	studies

c. When a root word ends in **y** preceded by a vowel, the root word is not changed when adding suffixes or endings.

play	monkey
playful	monkeys

d. When a one-syllable word ends in a consonant with one vowel before it, the consonant is doubled before adding a suffix or ending beginning with a vowel.

run	ship
running	shipping
	shipment

e. In words of more than one syllable, the final consonant is doubled before adding a suffix or ending if: (1) the last syllable is accented, (2) the last syllable ends in a consonant with one vowel before it, and (3) the suffix or ending begins with a vowel.

begin	admit
beginning	admittance

2. The letter **q** is always followed by **u** in common English words.

queen	quiet

3. No English words end in **v**.

love	glove

4. Proper nouns and most adjectives formed from proper nouns should begin with capital letters.

America	American

5. Most abbreviations end with a period.

etc.	Nov.

6. The apostrophe is used to show the omission of letters in contractions.

don't	haven't

7. The apostrophe is used to indicate the possessive form of nouns but not pronouns.

boy's	its
dog's	theirs

8. When adding **s** to words to form plurals or to change the tense of verbs, **es** must be added to words ending with the hissing sounds (x, s, sh, ch).

glass	watch
glasses	watches

9. When **s** is added to words ending in a single **f**, the **f** is changed to **v** and **es** is added.

half	shelf
halves	shelves

10. When **ei** or **ie** are to be used, **i** usually comes before **e** except after **c** or when sounded like **a**. (Note these exceptions: leisure, neither, seize, and weird.)

believe	neighbor
relieve	weigh

Phonics

An appealing approach to spelling would be to learn the symbols that represent some 44 different sounds and then be able to spell the words in the language. This is only partially feasible. Because of the regular nature of some sound-symbol relationships (41), phonics is an aid to spelling. Because of the irregular nature of other sound-symbol relationships (82), however, phonics cannot be counted on as a single approach to the teaching and learning of spelling. Children's knowledge of phonics does play a useful role in their attempts to spell unknown words (41, 80), and it is an essential element in the process called "inventive spelling" (70), but though productive, it is not complete.

In some spelling programs words have been organized under accepted reading generalizations. The expectation is that by learning the generalization and the words organized under it, students will be able to transfer the knowledge they gain to the larger number of words that could be classified under the generalization. Some who are aware of the differences between the decoding (reading) and the encoding (spelling) processes have recognized the limitations of such an approach and have attempted to organize words under what might be called spelling generalizations. This approach focuses on the spelling, rather than the reading, process. Because of the large number of exceptions, students are not expected to be able to transfer learning to all words whose sounds fit a particular

generalization, but the approach attempts to use phonics as an aid to spelling. Research is needed to determine the best ways to accomplish this objective.

There have been attempts to reform English spelling to give the language consistent symbol-sound relationships (61). Even though radical movements have met with little success, some researchers (63) see constant reform as encouraging. In spite of these gradual changes, today's teachers have the task of teaching the spelling of a language that is not totally consistent. Phonics will be useful in the teaching/learning process as long as teachers consider both its strengths and limitations.

Visual Memory

Visual memory, auditory discrimination, and the sense of touch (including motion) play important roles in the spelling process (9). Those who use all three elements effectively have promise of being outstanding spellers, for they not only hear the sounds of language, but they also visualize the representation of the sounds, whether phonically regular or not. Those who depend primarily on auditory discrimination will be somewhat successful in their spelling but, as has been pointed out, there are enough exceptions to cause the "mostly auditory" speller continuing problems. The kinesthetic sense, or sense of touch or motion, though potentially useful to all, plays a much smaller role in the spelling process and is associated mainly with the teaching of the handicapped (28).

Visual imagery has potential value for the speller. If a method could be developed for visualizing the sequence of letters in words to be spelled, students would be helped considerably in the spelling process. Implications are that productive efforts of spelling teachers may lie in the teaching of visual memory rather than in the numerous spelling-related activities in which they are now involved. However, such efforts (4 p. 38–40) have not proved too successful.

The benefits of visual memory and visual imagery warrant increased efforts. Better knowledge of the functions of the brain and greater availability of such resources as the computer may help to bring about the development of learning abilities previously viewed as impractical if not impossible.

Methods

Once much of the "what" to teach in spelling has been identified, it is important to turn to the "how." In doing so it is appropriate to recognize some of the most relevant methods that warrant treatment. Among those in formal spelling are the test-study-test approach, the self-corrected test, steps in learning a word, word list versus context, time, ineffective

practices, and the measurement of spelling achievement. The discussion of these approaches will also identify some of the needed research.

Test-Study-Test-Approach

An important function of the test-study-test approach to spelling is to allow students to spend their time studying words they have not mastered (69). After an objective review of the research, Sherwin (78) concluded that studies both before and after 1937 consistently favored the test-study over the study-test approach.

When a pretest is based on words used frequently in writing, students will know how to spell many of them correctly—although these words will vary for each individual. The number of words to include in a pretest should be based on the number that students need to learn. Then, when students can spell all the designated words correctly, they are at an independent level and will benefit little from spelling study.

If students are faced with long lists of words to learn, frustration and discouragement result, and they are in no position to learn. As indicated earlier, research conducted with handicapped students using the computer (43) showed that more learning took place when they worked with groups of six words than with a list of eighteen. Similar evidence exists (74) for other students who had difficulty with spelling. Further research is needed to determine the optimum number of words for different children to study at one time.

Self-Corrected Test

For several years the self-corrected test has been heralded as the "most important single factor contributing to achievement in spelling." This notion has developed from a study with sixth graders in which Thomas Horn (54) credited the self-corrected test with accounting for "90 to 95 percent of the achievement resulting from combined effort of the pronunciation exercise, corrected test and study" (p. 285). Since that time there has been sufficient evidence to establish the self-corrected test as a viable method of spelling study (31). Too often, however, its value is lost in the pretest procedure, and the two procedures are sometimes confused. The pretest is a means of identifying words that need to be learned. The self-corrected test is a process of learning those words. Effective time use results when the two procedures function simultaneously.

Referring to the self-corrected test, Ernest Horn (53) noted that "When corrected by the pupils and the results are properly utilized, the test is the most fruitful single learning activity (per unit of time) that has yet been devised" (pp. 17–18). Two conditions in this statement, "When corrected by the pupils" and "the results are properly utilized," need further research. Students can use many approaches to check their own papers.

At present, however, teachers do not know which method is best. They ask such questions as the following: How many words should be given before they are checked: one, few, or a large list? How should the words be checked? Should the teacher or a peer spell the words as the student checks the paper? Should the student check the words from an answer sheet at the desk or should the correct spelling be presented on a chart, on the chalkboard, or on an overhead projector? Can the computer be used to enhance this process? If so, how? Although suggestions have been made (53, p. 18), this problem has yet to be resolved. Research could provide direction for teachers. The meaning of "properly utilized results" needs clarification, and proven suggestions for use—whether they are for study, application, or diagnosis—should be provided.

Research has established the value of the self-corrected test as a learning device; it should be applied carefully in the learning process. Nevertheless, information on proven procedures for self-correction itself and proper use of results is still needed.

Effective Study Steps

Other methods can supplement learning from the self-corrected pretest. One of these procedures is the use of eight study steps (53, p. 19). Although there have been attempts to shorten or modify the steps (34, p. 483), the necessary elements appear in those that follow (53, p. 19):

1. Pronounce each word carefully.
2. Look carefully at each part of the word as it is pronounced.
3. Say the letters in sequence.
4. Attempt to see how the word looks in the mind and spell the word to oneself.
5. Check this attempt to recall.
6. Write the word.
7. Check this spelling attempt.
8. Repeat the above steps if necessary.

The continued effectiveness of these study steps may be attributable in part to the use of some form of visualization in each step.

List Versus Context Approaches

Since the acquisition of a core spelling vocabulary is essential and the study of words remains basic to that acquisition, it is important to identify the most efficient ways to study these words. A long-standing debate in the classroom, if not in the literature, is the issue of whether to study words in lists or in context. Early studies (87, 56, 60) consistently supported the efficiency of the list approach. An occasional study (39) found learning spelling in context to be at least as efficient as the list

method, and one study suggested the value of a combined approach (85).

The list method is often misunderstood. Some people assume a list of words is to be studied in isolation; therefore they have difficulty accepting the approach. More is involved, however, to make this method palatable. To be effective, the words must first be chosen carefully. They should come from students' writing and should be used frequently. This helps assure that students know the meanings of words they are to spell. Another element often overlooked by critics is that words are presented in context. In pretests or posttests, a word is pronounced, used in a sentence, and then pronounced again, thus giving the learner the benefit of the word as it is used in a sentence. With words properly selected, and the meanings clear as a result of context, the student is now required to write only the words for spelling purposes. This procedure results in considerable saving of time compared with having students write the sentences using the words. The activity does not minimize the importance of oral dictation or evaluation procedures involving writing sentences when goals other than spelling are to be achieved. Neither is it intended to minimize the value of an evaluation activity that uses dictated sentences consisting of words taken from a student's previous spelling lists.

Amount of Time

When teachers ask how much time should be used for the spelling period, the answer is "from 60 to 75 minutes a week." This is a valid answer and is based on sound research. Original studies date back to the past century when Rice (73) explored the issue. Subsequent studies have verified Rice's findings (59, 57), and that amount of time is still recommended when students are studying words in lists.

Research findings relating to time are sometimes ignored by classroom teachers because they do more than teach students to study words in lists (31, pp. 37–38). Some students are involved in meaningless exercises, while others are engaged in worthwhile activities relating to the language itself. The beneficial activities take the form of learning about words—their history and functions—or the spelling period is closely tied to meaningful written experiences. Although attempts to tie predetermined word lists to writing are somewhat limited at present, they may have value and are worthy of further investigation. When effective related activities occur during the spelling period, more than "15 minutes" a day may be a justifiable amount of time (55, p. 1286).

Ineffective Methods

In the process of researching spelling, investigators find ineffective as well as effective methods. Cotton's (18) summary of an extensive review by Fitzsimmons and Loomer (31) identifies several "Procedures in

Spelling Not Supported by Research." They include the following:

1. Presenting words in syllabified form (as opposed to whole word presentation)
2. Stimulating student interest in spelling chiefly through offering rewards
3. Writing words several times (for initial learning or as part of correction)
4. Relying heavily on phonic rules
5. Having students study "hard spots" in words
6. Studying words before attempting to spell them
7. Individualizing time allocations
8. Having students work out their own methods for learning to spell
9. Writing words in the air
10. Initially presenting words in sentence or paragraph form. (18, pp. 15-16)

In addition to suggesting that teachers avoid these unproductive methods, another reason for citing these findings is to suggest that some of them may be altered through the use of the computer. One example is the fifth item in the preceding list—"Having students study 'hard spots' in words." It is possible that the computer, with its capacity to diagnose, prescribe, and visually portray letters and parts of words in a variety of ways, may assist students in such learning and thus alter this and other findings. Accordingly, some of these "ineffective" approaches may be revisited and altered by more advanced methodology.

Measuring Spelling Achievement

In some respects spelling performance is one of the easiest areas of the curriculum to measure. Methods of measurement generally fall into two categories: the written spelling test and the proofreading-type standardized achievement test. The written test is widely used and is considered to be a valid measure of spelling progress (16, p. 1201). It is inexpensive and easy to administer. Its greatest strength is that students write the words and use recall skills underlying the production of correct spelling (19, p. 721). Its limitations often make it unreliable, however, thus restricting its use. Poor handwriting, clues given by examiners, time, cost, and scoring errors are among these limitations.

Advantages of the proofreading-type test are that it is standardized, easily scored, and easily administered. Another advantage is its efficiency. It can cover four times as many words in the same time as the dictated word list (32, p. 71). Among its disadvantages are its lack of natural relevance, and the fact that students may learn incorrect spelling by seeing misspelled words (22, p. 12).

Of major interest to educators is the nature of the results obtained from written and proofreading-type tests. What is the relationship of student performance on the two tests, and do these tests produce the same results? It is generally accepted that the written test reflects students' abilities to spell. Questions are sometimes raised, however, concerning such an assumption about proofreading-type tests.

Research has consistently shown a high relationship between a student's performance on written and proofreading-type tests (32, 22). Allen and Ager (1) concluded that recall and recognition tests "may be considered equivalent measures of spelling ability" (p. 156).

Croft (19, p. 722) found that a written test had a higher correlation with spelling in written language than did a multiple-choice test and concluded that written spelling tests were more valid measures of spelling ability. Brody (14, p. 143) observed that the differences between proofreading test scores and recall test scores grow less marked with each succeeding grade level. He suggested the possibility that the two tests may measure somewhat different abilities. Allred (3) was perhaps the first researcher to compare students' performances on written and proofreading-type spelling tests of the same words in grades one through six. Although he found significant high correlations between performances on the two tests, he also found significant differences between the raw scores obtained on both tests in grades one through five. He therefore concluded that proofreading-type standardized tests were effective indicators of students' spelling ability and a viable method of testing for general, relative information. But when teachers want information on actual spelling performance, students in grades one through five should write the words. (This did not prove to be the case in grade six, however.)

SUGGESTED APPLICATIONS OF RESEARCH

Criticism is frequently aimed at educators in both higher education and in the elementary and secondary schools. University personnel are accused of conducting research and submitting their findings to journals read only by their colleagues; practicing educators are accused of implementing and perpetuating practices that are not founded on sound research and that are sometimes ineffective or even harmful. A need exists to bring the efforts of these groups together. Another need is to join existing proven practices with valid "new" practices in ways that will benefit students. The suggestions that follow are intended to help meet both these needs in the area of spelling.

Readiness

In order that students may realize growth in spelling, they must have two kinds of readiness. First, they must possess the necessary intellectual and physical capacities to perform the spelling act. Second, they must be prepared emotionally and want to learn. Teachers are often too demanding of young children as they express themselves on paper, sometimes forcing them into spelling study before they are ready. Awareness of readiness criteria can help teachers who are anxious to involve students in the study of spelling.

Through the years, research has identified a number of spelling readiness characteristics. Following is a concise, but rather comprehensive, list compiled by Edwin A. Read and others (72, p. 14). To be ready for formal spelling instruction each student should—

1. Have the ability to write and name all the letters of the alphabet correctly.
2. Be able to copy words correctly.
3. Be able to write his or her own name without copying.
4. Be reading at about a second-grade level or better.
5. Be able to enunciate words clearly.
6. See that words are composed of different letters.
7. Have a beginning phonetic sense and recognize the common letter-sound combinations.
8. Be able to write a few simple words from memory.
9. Ask for words he or she is in doubt about and be able to express a few thoughts in writing.
10. Demonstrate a desire and interest in learning to spell.

By reasonable adherence to these guidelines, teachers can enhance learning and avoid the negative attitudes and lack of progress that accompany the frustration students experience when they are forced into a learning activity for which they are unprepared. Children who do not meet these criteria will benefit more from activities that help them develop spelling readiness than they will from formal spelling instruction.

To say that students should not be forced into formal spelling study before they are ready does not mean they should not be encouraged to write before they can spell. Research (40, p. 6–7) indicates that children make attempts to write early—for example, they try to express their thoughts in writing through some form of art or through partial spellings of words. When they are not criticized or pressured, they are often willing to share these "written" expressions with others.

As a result of deeper understandings of child development and the writing process, children are encouraged to express themselves frequently on paper, focusing their attention on the ideas they are expressing rather

than on the form the expression takes. This attitude is partially responsible for the acceptance and encouragement of "inventive spelling" (33), a practice some consider to be an inherent developmental step in spelling (7), which encourages lifelong writing habits.

Formal Spelling

The need for a formal spelling program has been well documented (86, 30, 42) and it will continue to have a place in the curriculum. In most instances a published commercial spelling program will be made available for teachers. Those who make the selections should be well informed and guarantee that the programs use spelling vocabulary as well as methods and procedures that are founded on sound research findings.

It is also essential that teachers other than those selecting the spelling programs be informed and in a position to apply research findings. Applying this knowledge will enable them to use the programs effectively, modifying and supplementing them where necessary. Modifications might include instruction that takes into consideration emerging information concerning ways learners learn how to spell and aspects of the orthography of the language itself that prove useful in the spelling process.

Functional Spelling

The purpose of spelling is to assist individuals to become effective writers. Beause this purpose is often overlooked, spelling is sometimes seen as an end in itself. A future need, then, is to use spelling effectively as a means to an end. During a period when educators are committing more time, money, and effort to the writing process, a continuing body of research is expected to emerge. Some of that research will be in the area of spelling and the data obtained from it should be useful to teachers. Available information suggests there is value in teaching spelling as part of the writing process. Emerging evidence deals with the point at which spelling should be emphasized as well as the kinds of misspellings that should be tolerated.

In the beginning stages of writing, children should be allowed to focus on their ideas and the organization of those ideas without paying undue attention to spelling as they write. Misspelled words can be identified and corrected at the editing stage. Students should be given a time, a place, and ways to learn words that have proved troublesome in their writing. To avoid the frustration associated with learning long lists of words, it is suggested that original efforts concentrate on a limited number of frequently misspelled words. Another suggestion is to investigate the best ways to teach spelling in the writing process. By applying research findings it should be possible to help students become better spellers and more proficient writers through the writing process itself.

Individualized Spelling

Among the challenges teachers face are the individual differences and wide ranges of ability of students in their classrooms (83). As a result of these differences, many teachers desire to individualize their spelling curriculum.

Even though individualized spelling takes different forms, most studies favored the value of such instruction. Noall and Ceravalo (68) found an individualized approach to spelling to be effective. Edgerton and Twombly (25) reported that a programmed course benefited children. A longitudinal study comparing an individualized approach with a whole-class approach using the same elements favored the individualized approach (5), and evaluation of the same program at a more advanced stage produced similar results (79).

The findings of Durrell and others (24) indicate a promising use of the microcomputer in the individualization of instruction. These researchers found computer-assisted instruction to be an efficient means of teaching spelling. It is sensitive to individual needs, effective for weaker students, and useful for remedial work.

The effectiveness of these past approaches to individualized spelling instruction should encourage teachers to consider the individual differences and the wide ranges of ability of their students as they plan and implement their spelling programs.

Maintaining High Interest

Maintaining high interest is another important task facing the teacher of spelling since it is essential to spelling growth (36, p. 12). The test-study-test method has contributed to such motivation because students studied only those words the test revealed they could not spell correctly (69, pp. 86–87). Research to date has shown the computer to be effective in motivating students (77); it has also shown that an individualized approach to spelling added interest (79). One of the expected factors contributing to the success of the writing process is the high interest generated among students who are allowed to focus on content and organization (37, pp. 183–194) while they apply spelling.

Graham and Miller (36) have identified a number of methods that are well founded and contribute to the student's desire to spell accurately. These, as well as the preceding methods, should be helpful to teachers. They are as follows:

1. Showing the student the importance of correct spelling in practical and social situations.
2. Providing the student with an efficient method of word study.
3. Limiting the spelling vocabulary to words most likely needed in

the student's present and near future writing endeavors.

4. Encouraging pride in correctly spelled papers.
5. Requiring study of only those words that the student is unable to spell. (36, p. 12)

CONCLUSION

A desired outcome of this monograph has been to bring readers to an awareness of research-based trends in spelling study and to encourage them to continue to apply the methods that have proved useful in the past. Specifically, one purpose has been to help readers understand the place of spelling in the editing stage of the writing process, but also to help them recognize the need for using proven methods during a spelling period. Another purpose has been to encourage continued research on how to approach the study of spelling from the ways learners learn and from the nature of English orthography, without permitting commitment to either philosophy to cause the premature abandonment of knowledge already gained. Still another purpose has been to encourage readers to capitalize on the potential and positive influences of the computer while they continue to apply practices that proved effective before the advent of this new technology. By maintaining a proper balance, the best of the past can be joined to the best that is emerging to the benefit of all concerned—educators and students alike.

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